

CONTRIBUTIONS TO THE KNOWLEDGE OF THE REPTILES OF THE KARROO FORMATION.

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4. A New *Pseudosuchian* from the Orange Free State.

THE fossil under description is in the Bloemfontein Museum, and was found in a quarry near Rosendal, Orange Free State. It consists of a nearly complete individual on two slabs of matrix which unfortunately do not fit together. The fossil is mostly an impression of the right side of the skull and limbs, and besides this, consists of some vertebrae, a few ribs, a great part of the tail and of dermal ossifications. Some of the impressions are filled with a thin layer of ochre.

Through the bad way of preservation sutures are obliterated.

THE SKULL.

The preorbital part of the skull, the jugal and the postorbital with the mandible, are present as impressions of the right side. The postorbital part is very puzzling. The external nares are placed right in front and they are practically round. The preorbital cavities are small. They are a little larger than the external nares and have the shape of a triangle of which the base is parallel with the edge of the maxillary and the top and front angles are blunted off. The orbit is a little longer than broad and its lower and hinder rims form a nearly right angle. The temporal openings are indistinct. The lower temporal opening is large, broad at the bottom, and reaches nearly as high as the orbit. I am in doubt with regard to the supratemporal opening and the hinder part of the skull.

The premaxillary forms the lower border of the external nares. It supports three small pointed thecodont teeth. The two large ones behind these are probably already on the maxillary; they are separated from the front teeth by a small gap. These teeth must naturally have passed along the outside of the dentary. Behind them a part of the upper jaw is missing. A large tooth of the lower jaw has penetrated in this gap. Its impression stands a little further out from the matrix than the adjoining parts of the upper jaw, and I therefore conclude that the upper jaw was slightly bent inwards to allow this big tooth to pass along its outer side. The following maxillary teeth, numbering fourteen, are all small and diminish gradually in size going backwards. They occur till nearly below the middle of the orbit and are clearly thecodont. All that can be said of the maxillary is that it forms the lower border of the antorbital vacuity.

A narrow bridge separates the orbit from the preorbital opening, but it cannot be made out to what extent the jugal and the lacrymal participate in it.

The postorbital bar is directed upward and slightly forward, whereas in all the known allied forms this bar is directed upward and backward.

No sutures are visible in the lower jaw. It is highest across the Meckelian aperture, diminishes in height towards the symphysis, where a nearly equal height is attained. Two small teeth are visible at the symphyseal end. Behind these there is a large tooth, which must have reached above the upper border of the maxillary. Between this large one and the next, there is a little gap. Then follow some ten uniform small teeth, diminishing in size backwards.

At the hinder end of the skull there is a small, thin, curved bone, which is a portion of the hyoid.

Dimensions of the skull:

Length.....	91 mm.
From snout end to front of orbit.....	41 mm.
From hinder margin of nostril to hinder margin of pre-orbital cavity.....	32 mm.
Length of preorbital cavity.....	8 mm.
Height of preorbital cavity.....	6 mm.
Length of orbital cavity.....	18 mm.
Height of orbital cavity.....	15 mm.
Greatest height of dentary.....	12 mm.
Height across its narrowest portion.....	6,5 mm.
Greatest length of ordinary maxillary teeth.....	5 mm.
Length of large teeth in upper jaw.....	more than 8 mm.
Length of large tooth in lower jaw.....	10 mm.

THE VERTEBRAL COLUMN.

Only five presacral vertebrae, belonging to the lumbar region, have been preserved. They are amphicoelous, their neural spines are very broad, and there are distinct pre- and postzygapophyses.

Breadth of the spines.....	5,5 mm.
Total height of the vertebrae.....	15 mm.
Length of the centra.....	9 mm.

Of the tail 29 vertebrae are still present. The connection with the sacral portion is missing as well as the sacrals themselves, and this connection might account for quite a good number of caudals. The extreme end also is missing and we may therefore conclude to a very long tail, which was probably longer than the body with the skull.

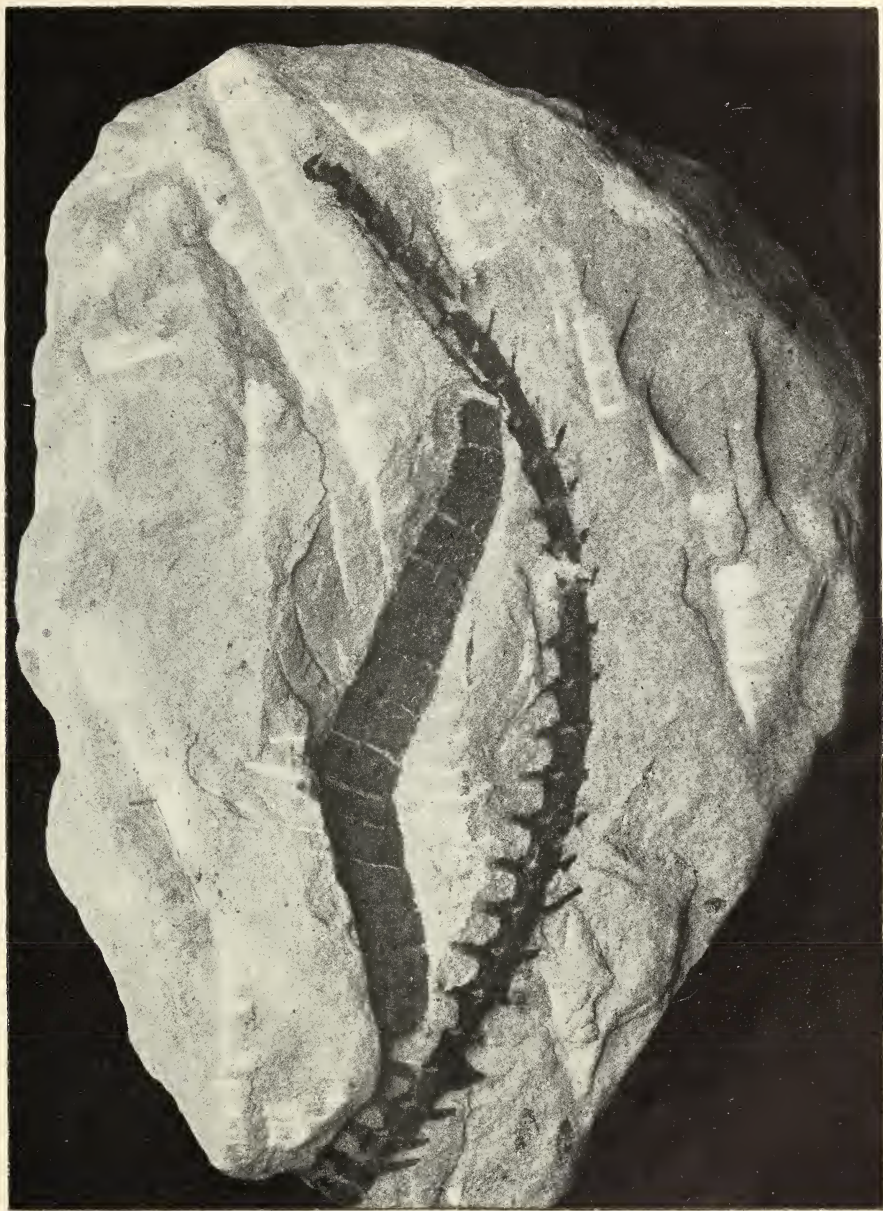
Eight dorsal ribs have been preserved, but the distal ends of all are missing. They are very slender and are clearly double-headed.

Of the shoulder girdle the two scapulae only are present. One of these is well preserved. Its distal end is very broad, measuring 19 mm., the shaft attaining a third of this breadth, while the proximal end has a breadth of 12-14 mm. The length of the bone is 28 mm. There is no evidence of an acromion.

The humerus is slender and is slightly bent. At the proximal end it is very broad through the formation of a processus lateralis. Between the upper articulation surface and this process the edge of the impression is convex. The length of the bone is 50 mm. The distance from the upper inner end of the bone to the end of the processus lateralis is 16 mm. The smallest transverse dimension of the bone is 4 mm.



Pedeticosaurus Leisneri. X 0,6.



Pedeticosaurus Leriseuri. Tail with dermal armour. $\times 0.68$.

The radius and ulna are very slender straight bones. Of the right fore-limb only an impression of the radius is preserved. Of the left the proximal portions of both bones are still in the matrix as impressions. The ulna is proximally thicker than the radius and has a well-developed olecranon process. The length of the radius is 43 mm.

Of the hand only one digit of the right extremity is preserved. Its total length is 28 mm. The metacarpal has a length of 10 mm. There are three phalanges. The carpus seems to have been very small.

Of the pelvis only the distal portion of the right pubis is preserved. This is long and very slender, its length as preserved being about 40 mm., and its narrowest portion being 3 mm. broad.

In the right hinder extremity only the distal half of the femur is present and in the left only the distal articulation portion. It is a strong bone which shows one curve and which may have had another. The length of the preserved portion is 56 mm.; the femur may have been some 10 mm. longer. Breadth at the distal end: 10 mm.

The tibia and fibula are long, straight, and slender bones. In both extremities one of the bones covers the other, but in the right leg they are still to be seen separately. They are both broad proximally and their length is 67 mm. The proximal end of the tibia has a breadth of 6 mm. The breadth of both shafts is 3 mm.

The foot is only represented fragmentarily in the left limb and seen from below. There are two large proximal elements in the tarsus and there may be four small distal ones. The impression of the astragalus is flat and square though slightly longer than broad, the greatest length being parallel to the axis of the limb. Its length is 7 mm. and its breadth 4,5 mm. The impression of the calcaneum is deep, which might indicate that this was a stronger bone than the astragalus. Length 6 mm., breadth 4 mm.

Four metatarsals have been preserved. These belong to the first four digits and are all nearly equally long. The third and fourth have nearly the same length. The second is just slightly shorter than the third and the first is slightly shorter than the second. Their lengths are: First 26 mm., second 28 mm., third 28,5 mm., fourth 28 mm. The first digit shows two phalanges, but the other three only show the proximal ends of the first. The first phalange has a length of 8,5 mm. and the second a length of 5 mm. The proximal breadth of the third metatarsal is 3,5 mm. The distal breadth of the first and fourth is 3,5 mm. and of the second and third 4 mm.

Dermal ossifications are present all along the back from the skull till far down the tail. There is also a dermal covering on the ventral side of the body. The dorsal ossifications are arranged in two rows, one row on each side of the dorsal spines with which they are in touch. These scutes have a rectangular shape and are mostly 10 mm. square. Some scutes of the tail which are not so well preserved as the others, are slightly shorter than broad. Those at the tail end are smaller than those of the body and each pair seems to associate with a vertebra. In view of this fact we might assume that there had at least been 22 presacral vertebrae.

The ventral scutes, which are much smaller, are arranged in longitudinal and transverse rows. They are strongest near the ventral middle and disappear towards the side. Four longitudinal rows were counted on one side in the scanty remains of this ossification in the present fossil. The length of some good specimens is from 4,5 mm. in the forward ones to 4 mm. in the more caudal ones and their breadth from 3,5 to 3 mm.

Apparently the present form is not closely allied to any of the known exotic *pseudosuchian* genera. This cannot be said off-hand of the South African forms, because these are only known from badly preserved specimens. It will therefore be necessary to compare our form with all those South African reptiles which show a sufficient resemblance.

Euparkeria BROOM.—A comparison with *Euparkeria* shows that in this genus the skull is much higher with regard to the length than in our fossil. In other words, the skull of *Euparkeria* is blunt compared with the new form.

The preorbital cavity in *Euparkeria* is much larger and has a quite different shape. The distance between the nostril and the preorbital cavity is much smaller in *Euparkeria*. There is further a marked difference in the dentition. The scapulae also show marked differences. A comparison of the feet gives the same result. The first metatarsal in the foot of *Euparkeria* is slightly longer than half the third metatarsal. In the present form they are nearly equally long. In *Euparkeria* the dermal scutes along the back are twice as long as those of the present form.

Mesosuchus WATSON.—Although *Mesosuchus* is probably a *Rhynchocephalian*, it is not out of place to mention it here, because it was originally taken to be a *pseudosuchian*. WATSON, and BROOM after him, both state that the teeth of *Mesosuchus* are acrodont. In the present form they are thecodont. The side view of the preserved part of the skull is quite different to that of the corresponding part of the Bloemfontein reptile.

“*Eosuchus*” WATSON.—VON HUENE pointed out that the name “*Eosuchus*” was preoccupied and WATSON’S type will therefore have to be renamed. The only possible comparison with our type is with the metatarsals. In “*Eosuchus*” the fourth is the longest. In our form the third metatarsal is the longest. The foot of “*Eosuchus*” is much nearer to the *Protorosaurus* foot than that of our form. The lengths of metatarsals I–V in “*Eosuchus*” are : 7,5 mm., 20 mm., 27 mm., 32,5 mm., and 14 mm.

Howesia BROOM possesses rather *Rhynchocephalian* properties.

Proterosuchus BROOM is more than twice as large as our form.

Erythrosuchus BROOM is still larger.

Apparently the above leads us to accept the present form as new and belonging to a new genus. I propose to call it *Pedeticosaurus Levisiuri* in honour of Mr. M. LEVISEUR, the enthusiastic Hon. Secretary of the Bloemfontein Museum.

Pedeticosaurus is only closely allied to one of the four known families of the *Pseudosuchians* i.e. the *Ornithosuchidae*. V. HUENE places *Ornithosuchus* and *Euparkeria* in this family. Both these genera have broadly identical relations in the preorbital portion of the skull and as already stated above, these are entirely different to the conditions existing in

Pedeticosaurus. The new genus may, therefore, be regarded as the type of a new family, which may be called the *Pedeticosauridae*.

I am indebted to the Committee of the Bloemfontein Museum, who most kindly put this fossil at my disposal and also to the Director and Committee of the Transvaal Museum, who allowed me to visit Bloemfontein for the description. My thanks are also due to the Director of the Albany Museum, who kindly sent me a sketch of the hind-leg of "*Eosuchus*" and the measurements of its metatarsals.

Plates XIII and XIV.

The remains of *Pedeticosaurus Levisauri*.

Plate XIII × 0,6.

Plate XIV × 0,68.